Unusual catch of bluefish *Pomatomus saltatrix* (Pomatomidae) in Tarska cove (northern Adriatic)

by

Jakov DULČIĆ (1), Miro KRALJEVIĆ (1), Armin PALLAORO (1) & Branko GLAMUZINA (2)

RÉSUMÉ. - Capture inhabituelle de *Pomatomus saltatrix* (Pomatomidae) dans l'anse de Tar (Adriatique nord).

Une pêche inhabituelle de *Pomatomus saltatrix* (poids total de 1520,8 kg) a été effectuée dans l'anse de Tar (estuaire de la Mirna, Adriatique nord). Cette capture est la plus septentrionale pour cette espèce en Méditerranée (à l'exclusion de la mer Noire).

Key words. - Pomatomidae - *Pomatomus saltatrix* - MED - Adriatic - new record.

Bluefish, *Pomatomus saltatrix* (Linnaeus, 1766), is a pelagic and migratory species, which inhabits coastal temperate and subtropical waters of all ocean basins except the eastern Pacific. The known range includes the eastern coast of the Americas, northward regularly to Cape Cod, occasionally to outer Nova Scotia, south to Brazil and Argentina; Bermuda; eastern Atlantic, Azores, off Spain, and northwestern Africa; the Mediterranean and Black seas; both coasts of southern Africa and Madagascar; eastern Indian Ocean and Malaysian Peninsula; southwestern and southeastern Australia (Klein-McPhee, 2002). It is found throughout the Mediterranean and Black seas (Tortonese, 1986), being more abundant in the south and eastern Mediterranean. It occurs in oceanic and coastal waters (Jardas, 1996). However, relatively little is known about the species in the Mediterranean. References are very scarce and limited to some observations about its presence in certain areas, the relative importance of the fishing and duration of spawning. Sabatés and Martin (1993) reported about spawning and distribution of bluefish in the NW Mediterranean, while Gordina and Klimova (1996) about its spawning in the Black Sea. This species is fairly rare in the Adriatic, occurring mostly in the southern part (Jardas, 1996). The aim of this paper is to present data about an unusual and surprising catch of *P. saltatrix* in the northern Adriatic (Tarska cove, Mirna estuary). This record could be definitely verified as the northernmost record of this species in the Mediterranean area (excluding Black Sea) (in scientific literature) since previous records (3 specimens) in the same area were published in the report of local study and needs verification.

The Mirna estuary (Tar cove) is specific and productively rich habitat of a large number of commercial fish species. Traditionally, the estuary has been fished once or twice a year for more than 900 years. Family Mugilidae was numerically dominant and constituted always more then 85% of the total catch (Kraljević *et al*., 1994). The Mirna estuary (Tar cove) is situated on the western coast of the Istrian peninsula, eastern Adriatic (13°30'N, 45°20'E) (Fig. 1). Material was collected in winter (18-23 Dec. 2003) by specially constructed tow nets with bag ('ciplarice') or 'mullet nets'. These nets are used only in the area of the Mirna estuary. The total length of a net is 1450 m. They are set so as to enclose the whole bay from

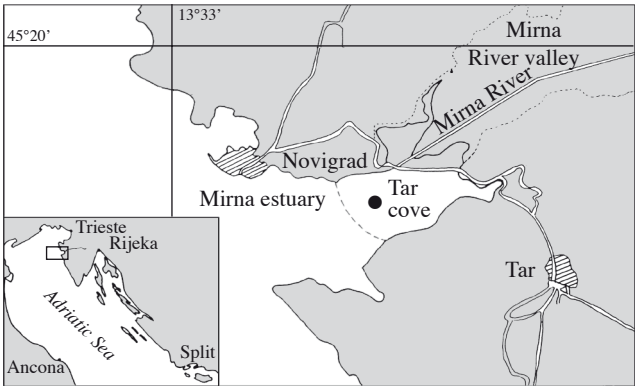

Figure 1. - Map of Mirna estuary (Tar cove, northern Adriatic) showing sampling area (●) of *Pomatomus saltatrix*. *[Carte de l'estuaire de Mirna (anse de Tar, Adriatique nord) avec la localisation de la zone de capture* (●) *de* Pomatomus saltatrix.*]*

one side to the other (north-south) at a length of 1300 to 1350 m. Net is 15 to 30 m deep. Mesh diameter is 22 mm. During the five days of catching, 1520.8 kg of bluefish was caught. That was really unusual and surprising catch since none of the fishermen from this region recognize the species. We took a sample (N = 102). Total length frequency, length-weight relationship and age structure were analysed. Individuals ranged from 37.2 to 66.1 cm (mean TL = 44.6 cm ± 3.84), while weight from 481 to 2505 g (mean weight = 765.0 ± 249.22 g). The length-weight equation was: $W = 0.0115 \times L_t^{2.918}$ ($R^2 = 0.917$), indicating isometric growth. Three age classes, ranging from 2^+ to 4^+, were defined by scale readings proposed by Salerno *et al*. (2001). Modal age was 2^+.

Graeffe (1888) noted the presence of the bluefish at the Trieste fish market (northern Adriatic) and its occurrence together with jellyfish *Rhizostoma pulmo*, but this report did not provide the exact area from where fisherman brought the species to market. Several specimens of bluefish have been caught until now in the eastern Adriatic, the first one near Dubrovnik (southern Adriatic) in June 1887, and the second near Split (without data of capture) registered by the famous ichthyologist J. Kolombatović (Langhoffer, 1903). Further records were made near Vranjic (Split area) on June 16 in 1938 (Pallaoro and Jardas, 1996). Dulčić *et al*. (2000) reported the first occurrence of bluefish juveniles in the eastern central Adriatic suggesting that species probably spawns in the middle Adriatic or even further south. From 1989 until 2002, 3 specimens were caught in the Tarska cove, but those records were published in a local study report and were unavailable to scientific community and probably need verification (Kraljević, pers. comm.).

(1) Institute of Oceanography and Fisheries, Šetalište Ivana Meštrovića 63, PO Box 500, 21000 Split, CROATIA. [dulcic@izor.hr]

(2) University of Dubrovnik, Aquaculture Department, Ćire Carića 4, 20000 Dubrovnik, CROATIA.

Sabatés and Martin (1993) stated that the northern limit of the geographic distribution of bluefish in the Mediterranean is the Catalan coast, but the findings of bluefish specimens in the Tar cove (Mirna estuary, northern Adriatic) could not support this statement. Spreading of this species to the northern parts of the Adriatic is obvious and this is in agreement with findings of Sabatés and Martin (1993). Those authors observed that spatio-temporal distribution pattern of bluefish in the NW Mediterranean has shown it to be at the boundary of its geographic distribution. They related species increasing occurrence in the northern parts of the Catalan coast with gradual increase of temperature in the region. The same authors also stated that bluefish are expanding their range in the Mediterranean despite the thermal restrictions to their distribution. An unusual occurrence of such rarely found fish in the northern Adriatic could be related to the changes in climate and/or oceanographic conditions (input of intermediate Ionian waters in the middle Adriatic which influenced the increase in salinity and temperature - Adriatic ingressions) (Dulčić *et al*., 1999; Dulčić and Grbec, 2000). Bluefish migrate to warmer waters during winters and to cooler waters in summer (Dooley, 1990). It should be emphasized that these last years eastern Adriatic was characterised by records of thermophilic species as, for example, *Plectorhinchus mediterraneus* (Lipej *et al*., 1996), *Ruvettus pretiosus* (Bettoso and Dulčić, 1999) and *Epinephelus coioides* (Parenti and Bressi, 2001). The only and surprising difference between these records is the quantity of bluefish caught (1520.8 kg) instead of 1 or 2 specimens previously. The catch in an estuarine habitat (Tar cove, Mirna estuary) is not surprising since this piscivorous species relies on estuarine habitat for feeding and nursery grounds after oceanic spawning and inshore migration of larvae (Harding and Mann, 2001). Another reason for such unusual occurrence could be related with to feeding migrations since adults are in loose groups, often attacking shoals of mullets (main fish group in Tar cove are mullets) or other fishes destroying numbers apparently far in excess of feeding requirements (Collette, 2003).

The status of the bluefish needs to be evaluated on a continuous basis because it is becoming increasingly apparent that uncommon species, and particularly those on the edge of their distribution, can be essential indicators of environmental change.

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